GARDEN AND FOREST.

PUBLISHED WEEKLY BY

THE GARDEN AND FOREST PUBLISHING CO.

OFFICE: TRIBUNE BUILDING, NEW YORK.

Conducted by . . . . . Professor C. S. SARGENT.

ENTERED AS SECOND-CLASS MATTER AT THE POST OFFICE AT NEW YORK, N. Y.

NEW YORK, WEDNESDAY, JUNE 8, 1892.

TABLE OF CONTENTS.

PAGE.

EDITORIAL ARTICLES:—The Beauty of Our Trees in Spring . . . 265
Bulbous Plants in Grass . . . 266
Practical Forestry . . . *John D. Lyman.* 266
May in West Virginia . . . *Mrs. Danske Dandridge.* 267
The Raisin Industry in California . . . *T. Goodman.* 268
NEW OR LITTLE-KNOWN PLANTS:—Boltonia latisquama. (With figure.) . . . *C. S. S.* 268
New Orchids . . . *R. A. Rolfe.* 268
FOREIGN CORRESPONDENCE:—The Experiment Garden at Wisley in England . . . *V. C.* 269
CULTURAL DEPARTMENT:—Hardy Narcissus . . . *O.* 270
The Rock-garden . . . *M. Barker.* 272
Garden Notes . . . *E. P. Powell.* 272
The Garden in May . . . *J. N. Gerard.* 273
The Bachelor's Button . . . *M. Barker.* 273
CORRESPONDENCE:—The Winter-killing of Conifers, *Jackson Dawson, Fred. W. Kelsey.* 273
The Waukegan Nurseries . . . *S.* 274
RECENT PUBLICATIONS . . . 275
NOTES . . . 275
ILLUSTRATION:—Boltonia latisquama, Fig. 51 . . . 271

The Beauty of Our Trees in Spring.

FOR three centuries the splendor of the autumn colors of the American forest has been a favorite theme with the writers on the beauties of nature. Little, however, has been said of the peculiar beauties of our trees in early spring, and probably few persons, except the elect who worship in the inner temple of nature, recognize the subtle charm of our woods at this season or realize the variety and harmony of the apparel which our trees put on to celebrate the return of the vernal season. Here at the north in no other month are trees more beautiful than in May, when more clearly, than later in the year, appears the contrast between a forest of many species grouped as nature alone knows how to blend various distinct forms and many distinct shades of colors in one harmonious whole, and forests like those of Europe composed of a few species only. In May, from the top of a New England hill, or better, from one of the high summits of the southern Alleghanies, over which is spread the most varied, luxuriant and magnificent collection of deciduous trees in the world, may be seen the American forest in its most charming aspect, the outlines of individual trees veiled, but not hidden, by the opening leaves, which vary on each species in tone and color. This first flush of woodland beauty lasts only a few days, but they are precious days to the lover of the forest and to the student of individual trees, for the one can delight his eyes and study the harmonies of nature, and the other learn of characters, as constant as the structure of flowers or fruit, which will aid him in distinguishing the different species, for each may be recognized in early spring by the appearance of the very young leaves or of the scales of the leaf-buds, which on many trees in unfolding lengthen and assume bright colors. This is the case with the Horse-chestnuts, with many Maples, with all the trees of the Rose family, especially the Plums, Cherries and Hawthorns, and with all the Hickories, whose bud-scales grow to a great size before falling.

The vernal parade is led by the Red Maple and the White Maple; it is, however, with brilliant flowers, and not with unfolding leaves, that these celebrate the coming of spring, and before the leaves of these two trees unfold their flowers have fallen, and the brilliant scarlet fruit of the Red Maple has grown to its full size. Certainly one of the most beautiful objects to be seen in our woods in early spring is a Red Maple covered with fruit, which varies in brilliancy on different individuals, and at the north sometimes suffers from frosts which destroy the flowers. In southern Arkansas, Louisiana and Texas, where a variety of this tree grows with large and brilliantly colored fruit which frosts rarely injure, in March the Red Maple growing among the broad-leaved evergreens, which are common in that part of the country, is seen at its best, making a note of color in the landscape, and a sensation on the mind which time does not dull.

In northern woods the Amelanchiers are conspicuous in early spring by the colors of their unfolding leaves; in one form these are red, in another silvery white, and their vernal beauty is increased by brilliant scarlet bud-scales and bracts and by the silky white hairs which clothe the young growth. Of the delicate beauty of the flowers of this tree it is not necessary to speak, for every one who walks abroad in early spring knows the white flowers of the Shad-bush, which in April and early May enliven the banks of swamps and upland woods all over eastern America. Not less beautiful, perhaps, although less conspicuous and less familiar to the unpracticed eye, is the opening of their leaf-buds, which precedes the unfolding of the flowers. Among smaller trees the red shoots and young leaves of the Stag-horn Sumach and the deep bronze-green of the unfolding leaves of the Sheep-berry (Viburnum Lentago) add variety and charm to road-sides and forest-copses. Every one knows the tender green of the young foliage of the Beech, the most delicately vernal green of the forest, but this tree is well worth careful examination in early spring, when the expanding bud-scales are brilliant in color and the lengthening shoots and unfolding leaves are covered with soft pale hairs.

But the Oaks, perhaps, will best repay study in early spring; they make up a large part of our eastern forest-growth, and it is their variety and the peculiarity of each species that gives the character to our forest-scenery. Each species in early spring is distinct in color and in tone, and it is by the blending of these elements into a composition of perfect harmony that Nature shows how pictures may be composed, and how variety within certain limits is necessary if the greatest beauty of the landscape is to be obtained.

The earliest of our northern Oaks to spread its foliage is the Red Oak; the young leaves are yellow-green, in tint not very unlike that of the Beech, and are half-grown before the opening of the flowers which during a week in May make the trees great yellow bouquets. Rather later the Black Oak unfolds its leaves; at first they are bright scarlet on their upper surface, the under surface being covered with a pale coat of white wool. The red color gradually fades, and at the end of a few days they are light yellow-green. It is the Black Oak that in spring gives the soft hazy appearance to upland Oak-woods, although at one period of their development the leaves of the White Oak are not very different in color; these when they appear are sometimes bright red and sometimes delicate gray or mouse color, although before the flowers, which open late, appear they are more than half-grown and soft light green. The young leaves of the Bur Oak are orange and those of the Chestnut Oaks are light green. The Bear Oak is one of the most beautiful of all our plants in spring; the leaves are red until they are half-grown and until after the appearance of the bright yellow flowers.

We cannot pretend to describe even in the briefest and most unsatisfactory manner the vernal beauty of all our trees, or do more now than mention the grace of the Birches at this season of the year, the tender yellow-green of

the Sassafras, the sturdy unfolding buds of the Hickories, the red tints spread over the leaves of the wild Cherries, the beauty of the vernal Hornbeam and Hop Hornbeam, of the late-flowering Maples, of the Ashes, the Locusts, the Elms and the Hackberry, or of the conifers of which each species signals the return of summer in its peculiar way. A volume might well be written on the vernal characters and beauties of the trees of eastern America, but all we can hope to do now is to point out a woodland path, where there is much to be seen and many things to learn for the man who knows how to see, in the belief that he who does not know trees in spring and has not watched the early stages of their yearly growth has lost one of the best pleasures of life and missed one of the benefits which we Americans have in living in a country of such varied, interesting and beautiful forests that the forests of all other temperate lands are in comparison tame and uninteresting.

A writer in *The London Field* discussing the attempts which have been made in recent years to introduce bulbous plants into the grassy slopes of the Royal Gardens at Kew, sensibly calls attention to the fact that, "in such a vast garden there are many opportunities of carrying out this excellent system, particularly where the branches of trees touch the ground. In every one of such cases some of the delightful early flowers might be in position, the sheltered ground around such trees being exactly what many bulbs delight in. Hitherto use has been made of popular flowers well known in gardens, but this system may enable us to use with effect beautiful flowers that have not been generally considered worthy of cultivation in gardens—flowers which perhaps looked at in the hand are not so attractive as Lilies or Daffodils, but which might furnish new effects when seen in quantity. We mean such flowers as the less showy sorts of the Star of Bethlehem, Gazea, and even Allium, Fritillaria, European Gladioli, Grape Hyacinths, which we find thrive freely in grass, and the species of wild Tulip which are rarely seen in all their force of color, and also some of the beautiful and less showy spring flowers which might be used more freely, such as the Snowflake, principally the spring variety; St. Bruno's Lily in the rich grass is delightful, and the Dog-tooth Violet, which thrives in grass, and which, however dwarfed and starved, is always beautiful. The contrast between short turf and the waving grass full of flowers will be delightful. In the hot days of spring, flowers so often pass quickly away that it is a great advantage not to have to disturb the whole garden for them, whereas in the grass they are not in the way, and in the wild garden one bulb may succeed another, which is not so easy in the regular garden."

Certainly there is no more delightful form of gardening than this, or one which can be more easily executed if proper care is taken in selecting the plants to be used and in planting them. The essential thing in wild-gardening is the selection of the plants. These must look as if they were or might be wild, that is, they must harmonize with their surroundings. A stately garden Tulip or a monstrous garden Hyacinth looks out of place if it is seen by a wild wood-walk or in a field of waving grass, just as a great double-flowered Pæony looks out of place anywhere but in a garden-border. For natural planting, wild forms, or forms which have suffered little change by cultivation, are essential, although it is perhaps our association of such garden-plants with trim beds or borders rather than any inherent unfitness in the plants themselves that makes them appear out of place outside the garden proper.

Grass must be cut even by the borders of the wood-walk, although the operation may be delayed perhaps until July, so that it is necessary to select plants to plant in the grass that ripen their foliage early in the season, unless it is proposed to replant them every year. The Snowdrop, and the Crocus, especially white and yellow flowered varieties, can be used to advantage in this way. All the Narcissi look well in the grass, and ripen their foliage early, although the Poet's Narcissus appears to thrive in grass better than any of the yellow-flowered varieties, and is perhaps the best of all plants to use in this way. With it will bloom the Blue Bell or Wild Hyacinth (Scilla nutans), a charming plant with flowers which are sometimes pink or white as well as bright blue. Some of the small-flowered wild Tulips, like Tulipa Persica, look well in the grass, as does the Star of Bethlehem, which has become naturalized in some parts of the country, and the Grape Hyacinth. All the Buttercups are beautiful in the grass, and so are our native Iris if the ground is moist enough to insure their vigorous growth. The list of plants, however, which can be used in this way is not a very long one, although among our native plants there are probably a few that can be seen to their best advantage in this way, and we recall a bank from which the grass is cut every year in June for hay, on which the Cuckoo-flower (Cardamine pratensis) has held its own for years, and gradually spread over such an area that now its lovely pale lilac flowers make a brave show as they gradually unfold during the last two weeks of May.

Practical Forestry.

THE following account of an experiment in growing White Pines in Durham, New Hampshire, by the Hon. John D. Lyman, of Exeter, appeared in a recent number of *The American Cultivator*:

In the year 1870 I purchased the abandoned Pike Farm. Some two or three years afterward I noticed about an acre of little Pines growing very thickly upon the land. In their condition at that time they had no market value. Mr. I. P. Berry, the treasurer of Strafford County, who thinned these trees for me, said that the acre of land with the little Pines would not then have sold for $3.00. The process of thinning out was commenced about eighteen years ago, and has been continued at various times since, but the growth has never been sufficiently thinned, and even now numbers 178 trees. I think there should not be over 100 trees at this stage of growth.

For the purpose of thinning I recently cut one of the smallest, most crowded and oldest trees. This tree had once lost its main top, which, of course, checked its growth for several years, and it has been so much crowded that during the past ten years its growth has been very slow. Yet this tree was seventy-seven and a half feet in height, measured thirteen inches across its stump, and nineteen inches in circumference fifty-seven feet from the ground. I measured the circumference of the trees four feet from the ground, standing nearest a straight line drawn through the centre of the lot, and found the average to be a little over forty inches. One tree standing on the edge, and not included in those which averaged forty inches in circumference, girded seventy-four inches four feet from the ground. This one, of course, is "limby" on the side toward the cleared land.

As these Pines came up very thickly, they had no large, low limbs. Their small limbs died for quite a distance from the ground. Several years ago I removed these dead limbs, leaving none within about twelve feet of the ground. Not being able to secure a suitable saw in Boston, I had one made from a wood-saw, and at an outlay of about three cents a tree I have lately had these dead limbs taken off, say eighteen or twenty feet from the ground. My object is not to promote growth, but to prevent loose, black knots in the boards. I presume it is generally known that while the Pine-limb is alive the knot is of a reddish hue and secured fast to the wood, but after the limb dies the annual growth of the trunk pushes out over the dead limb, and this part of the knot is black and often so loose as to fall out and leave a hole in the board when sawed from the log. The difference in value between clear pine boards and those abounding in knots, and especially in black, loose knots and knot-holes, is well understood by those who buy and sell lumber. In my experiments I am attempting to grow good lumber, instead of knotty, cheap lumber.

The greatest number of rings (these generally correctly indicate the age of the tree) which I have ever found in any Pine in the clump of which I am writing was forty-five. This number of rings I found in the tree lately cut. As its height was seventy-seven and one-half feet, the annual gain in height was twenty and two-thirds inches, presuming the tree to be forty-five years of age.

The fencing, shingle stuff and small timber taken from this clump in the process of thinning have very liberally paid all expenses. Had this acre been left entirely to nature and nature's methods of growth, there would have been at this time some seventy cords of wood upon it, which for fuel would have paid little or nothing over operating expenses at present market values. The border trees, and a few others, would have made small timber or box boards of little value.

I have never seen the groves of trees set out by the wealthy Massachusetts amateurs, Mr. Fay, of Boston, and others, but I think they would have found their investments more profitable had they properly thinned their groves from time to time. Thinning requires judgment and experience. The scorching of the trees by the sudden admission of sunshine upon the tender bark is to be avoided. The danger from wind is to be guarded against. If the trees are too far apart they grow too "limby," and if left too close they grow too slim and too slowly.

One of the first points to be learned in order to grow a crop, whether of timber, corn, or any other, is the number of plants to the acre which will produce the best results. Thus, too many corn-plants give nubbins, or no ears at all; too many potato-stalks give small potatoes; too many tree-plants give poles instead of timber. Years ago, my idea was to have Pines for timber trees very thickly set when young, so as to prevent large lower limbs. This theory proves to be a correct one. I then thought to thin out many times until the trees were about forty-five years of age, and then to leave one hundred to the acre until they were about sixty years of age, when I expected the trees to average each the equivalent of five hundred feet of inch boards, or fifty thousand feet of inch lumber to the acre. I then proposed cutting the whole or thinning again. After years of observation, I think I was about right at that time, though perhaps eighty Pine-trees to the acre, at forty-five years of age, would prove more profitable than one hundred.

B. E. Fernow, Chief of the Forestry Division of the Department of Agriculture, in Official Bulletin No. 5 on Forestry, states that 270 is in general the right number of timber trees to stand to the acre 100 years for timber. If this theory is correct, I am far from right in practice. Pines take less room than Oaks and other branching trees. I have studied nature and her ways without avail if 270 White Pine-trees is the proper number to be grown to the acre for timber until a hundred years of age. I have with measuring-line traversed our forests, and carefully studied their growths, and have consulted many owners of forests and many lumber operators, who have hundreds of acres of Pine-trees, but I find not one of them confirming the theory of growing as many trees to the acre as is recommended by the Chief of the Forestry Division.

The White Pine (Pinus Strobus) a hundred years in growing should certainly make 1,000 feet of inch boards at the mill, and thus we should have 270,000 feet of inch lumber to the acre, or an average growth of 2,700 feet per acre each year of the hundred. This is far beyond any growth to be found in my section. In my experience while lumbering I never cut 100,000 feet board measure upon any one acre. Set in regular squares, 270 trees to the acre would stand a little over twelve and a half feet apart from centre to centre of trees. I can find no two Pines of considerable size and thriftiness standing thus near to each other, with any considerable number of live limbs on the sides facing each other. Nor can I find such a Pine surrounded by trees equally high, and only thirteen feet distant.

One of my last object-lessons in forestry from nature was in the grand old woods upon the agricultural college farm in Durham, New Hampshire. The land is good, at a very low altitude, and all the conditions are favorable for tree-growth which has been undisturbed for 140 to 150 years. Professor Pettee, of the college, selected, at my request, what he considered as good an acre of Pine-timber as the forest contained. Upon that measured acre we found 156 live trees and thirty-four dead ones, including those which had already died and fallen. Their circumference four feet from the ground varied from twenty-two to ninety-eight inches. Two of these 190 trees were Birches, two White Oaks, one Maple, ninety Hemlocks, while the balance were White Pines. The average circumference of the 190 trees four feet from the ground is fifty-four inches and a fraction. The clump of New Durham Pines belonging to me has more than half as much timber to the acre as has the acre at Durham College, and will, barring accidents, by the time the trees are one-half the age of the Durham trees, have not only more timber to the acre, but of better quality.

This shows the advantage of aiding nature in the production of timber, the same as in the production of other crops, and proves the profits of practical forestry. Why did the thirty-four trees on the Durham tract die? With very few exceptions, I have no doubt they were shaded to death by the other trees, although there were only 190 trees to the acre. A Hemlock-tree will grow in the shade where a White Pine-tree will die, and hence I presume by mixing Hemlocks and White Pines, as is the case in Durham, more trees can be grown to the acre than there could be of White Pines alone.

[After the extracts which we have quoted from Mr. Lyman's article were in the form for printing we received a note from Mr. Fernow, expressing the hope that he may find time soon to give our readers his views on the growing space which is needed by forest-trees.—ED.]

May in West Virginia.

STILL the Roses tarry, though a few are opening here and there. The Ramanas Rose, Rosa rugosa, is an early bloomer, with large, showy, single flowers of a bright crimson. They are very fragrant. It is delightful to know that no insect finds its handsome foliage toothsome; this fact makes R. rugosa especially valuable in the shrubbery. Madame George Bruant, which is a beautiful White Rose of Tea and Rugosa parentage, does not possess the acidity of foliage which is the protection of the Ramanas Rose, and the slugs feed upon it unless deterred by copious doses of hellebore or slug-shot.

Cinnamon Roses are now rioting over the garden, mingling their fragrance with that of the Mock Oranges, Locust blooms and Yellow Lilies. Valeriana officinalis, or Mountain Heliotrope, as it is called in this neighborhood, grows freely in the Lily-beds and has a refreshing and quieting perfume. This may be only imagination, but it is true that different perfumes affect the nerves in various ways. Thus the odor of Mock Orange, or Philadelphus, is overpowering to many people whom the breath of Lilies-of-the-valley, of Heliotrope, and the delicate fragrance of Roses and Honeysuckle thrill with delight.

Staphylea Colchica has a very powerful perfume suggesting Orange-flowers. It makes a handsome bush with its small, trifoliate shining leaves and pure white blossoms succeeded by bladdery pods. This Staphylia is now blooming and is much later than its American relative, S. trifolia.

Scotch Broom is one of the most showy members of the Pulse family. To-day it is shining with bloom. The leaves are wet from a heavy shower, and standing in full sunshine, the whole plant sparkles joyously, fairly lighting up its corner of the shrubbery, and even surpassing the Laburnums, which are flowering very sparsely. Coluteas are also coming into bloom. The Pulse family has representatives that extend the blossoming season for these plants from May until late in the autumn. Perhaps the familiar Sweet Peas, with their wonderful capacity for improvement, are the general favorites, but there are many charming members of this family among annuals, herbaceous perennials, shrubs, vines and trees that are rarely seen in cultivation. One of these is the Yellow-wood, Cladrastis lutea. We are now enjoying the rapid and vigorous growth of a very small specimen of this beautiful tree planted six weeks ago, which greets us with new twigs and leaflets at every inspection. The Cladrastis is a native of Kentucky and the south, and has a compact head with a tendency to develop more on one side than the other, even when planted in the open and exposed on all sides to the sun. It has a very smooth bark and beautiful light green foliage, which turns to a warm yellow in the fall. It begins to bloom when small, and has hanging panicles of flowers, often a foot in length, cream-white and pleasantly fragrant.

Tulip-trees (Liriodendron Tulipifera) are now in bloom. They grow to enormous size. Our largest specimen girths nineteen feet four feet from the ground, and is as tall as our tallest Oaks. It is perfectly straight, and forms, with its four brothers, which are almost as large, a fine approach to the house, following, as they do, the line of the winding road. Just now they are busy marts for myriads of bees. Their profusion of green and orange Tulip-shaped blossoms, and their habit of standing out as they do in relief against the bright blue sky, make them worth coming miles to see. These are our largest trees, though we have one Oak which is nineteen feet in circumference, and many more of great size and unknown age.

Our most satisfactory Rose is a climber with Tea blood, and yet of vigorous growth and very profuse bloom. This is Madame Alfred Carrière. It has long outgrown the trellis, seven feet in height, which we thought ample when the Rose was planted five or six years ago. This Rose is large, well formed, double, delightfully fragrant, and is a beautiful cream color with rosy heart. It is hardy, and never receives the slightest protection and very little care, yet we find it hard to restrain it within due bounds. It is our favorite, though we

have many other Roses. Queen's Scarlet, Hermosa, Monsieur E. Y. Teas are now in bloom, and the old-fashioned Giant of Battles has a few flowers of glowing crimson.

Weigelas, Rhododendrons and Pæonies of the Officinalis type are our most showy May flowers. One great double Pæony is the color of the Giant of Battles Rose, and is magnificent at this time. I think it is Pæonia officinalis rubra.

Spiræa Cantoniensis, often called S. Reevsiana, is still very pretty, and so are the earliest Deutzias (D. gracilis). But it is for the Feast of Roses that the garden waits.

Rose Brake, West Va. *Danske Dandridge.*

The Raisin Industry in California.

FROM a carefully prepared article by T. Goodman in the *Overland Monthly* for May, we make the following extracts:

The picking of raisin grapes requires more care, and is a slower operation than the gathering of other varieties. The clusters, cut from the vine carefully, one by one, all imperfections and bad berries trimmed off, are then arranged regularly on the trays, so that all will have a fair exposure to the sun. If heaped, or overlying each other in the least, the drying of the under bunches will be greatly retarded.

To make good raisins the grapes should undergo a kind of fermentation in the first stage of curing, which gives them a puffed appearance, and fills the air with a pleasant fragrance. From ninety to one hundred degrees in the shade is the temperature most favorable for this process. After the fermentation has ceased, and the grapes have taken on the shriveled appearance characteristic of raisins, the sun can do them no harm, however hot.

To facilitate the drying, and render it uniform, the trays are reversed after three or four days, in order that the trays to the northward may be exposed to the south. When the upper side has become well cured, which may be anywhere from a week to two weeks, the raisins are turned. The reverse side does not require as strong exposure as the other.

The total time of curing varies greatly—from ten days, or less, in hot weather, to a month or more under unfavorable conditions. Raisins cured in about fifteen days are the best.

When the bulk of the raisins is properly cured the work of taking them up is begun. For this purpose the trays are collected and piled in stacks of fifty or more, and sweat-boxes, each holding about one hundred pounds when filled, placed alongside them. Three grades are usually made—extra fine bunches for Dehesa, or Imperial Clusters; ordinary bunches for London Layers; and imperfect bunches and loose berries to be run through the stemmer. Bunches not sufficiently dried are laid on the trays and exposed to the sun again.

Those put in the sweat-boxes are never uniformly dried, some being overcured, and some not cured quite enough. To equalize them and soften the stems, which are very brittle when taken from the trays, they are placed in a cool room and allowed to remain for a certain period, during which the stems become flexible, and the undercured raisins impart their excess of moisture to the overdried ones, the operation resulting in a perfect uniformity throughout the whole mass, and a moist softness and elasticity to be gained by no other means. The raisins, at this stage, undergo some completing and crowning process, not fully understood, accompanied by the emission of a fragrance of indescribable richness. This equalizing—or sweating as it is commonly called—is one of the most essential operations in raisin-making, and it should last ten days at the very least. Haste to get the crop to market has led to a neglect of this necessary process, much to be regretted. Raisins are purposely overdried, taken directly from the field, steamed and packed immediately. A continuance of this practice will do incalculable harm to the raisin industry.

A few extensive growers pack their own crops, but the bulk of the packing is now done by establishments organized especially for the purpose. These ordinarily buy the raisins in the sweat-boxes, but in some instances they purchase the crop upon the vines, picking and curing it themselves. The packing-houses are mostly located in the towns. Some of them employ more than five hundred hands. Women and girls come to the town from all directions during the packing season, parties of them renting houses or living, gypsy-like, in tents. Earnings range from $1.25 to $3.00 a day.

The raisins are then pressed and slid into the packing-boxes. They are made in three sizes, quarter, half and whole boxes, holding respectively five, ten and twenty pounds. The last is always understood when speaking of a box of raisins, the others one-half and quarter boxes. The top layer is surrounded with ornamental paper in addition to the plain white. The packer's label is placed over this, the printed cover nailed on, the edges nicely trimmed, and the box is ready for market.

Less care is required with loose raisins; and it is here that the greatest improvement has been made on the Spanish method of packing. A combined stemmer and grader has been perfected by which large quantities are handled with very little labor. The raisins are fed from a hopper into the space between a woven wire cylinder revolving within a larger cylinder of the same material, where they are broken from their stems; they then fall into a fanning-mill, by which the stems and dirt are blown away, after which they pass through a series of screens that grade them into as many different sizes as are desired. The better grades of loose raisins are packed in boxes with paper and labels, giving them an appearance nearly as attractive as that of layers; the inferior qualities are generally shipped in sacks.

The cost of labor prevents California from competing with Spain in some of the niceties of the raisin business. It would not pay us to trim and nurse the grapes upon the vines, in order to secure perfect bunches and large berries, nor to handle the clusters by the stems only. But with the exception of such fancy work, comparison with our great rival will be all in favor of California. Our grapes are more meaty and have a richer flavor, and our raisins are better cured, and will keep twice as long without deteriorating.

New or Little-known Plants.

Boltonia latisquama.

OF the small genus Boltonia, consisting of only three species, all confined to the territory of the United States, the most desirable as a garden-plant is Boltonia latisquama, of which a figure made from one of Mr. Faxon's drawings is published on page 271 of this issue.

Boltonia principally differs from Aster in the character of the appendix to the fruit or pappus, and, from the horticultural point of view, the plants of this genus are like tall loose-flowered perennial Asters.

Boltonia latisquama is a stout plant with thick striately angled stems, which attain a height of three or four feet, entire sessile leaves, which near the ground are large and broad and gradually decrease in size on the upper part of the stems, and broad, flat showy heads of flowers an inch and a half across with violet-blue ray-flowers.

It was discovered about thirty years ago, near the mouth of the Kansas River, by the late Dr. C. C. Parry, who sent it to the Botanic Garden at Cambridge, from whence it was distributed. In cultivation this handsome plant is very hardy and in good soil grows rapidly, soon forming broad clumps which in early autumn are covered with flowers. It is one of the best garden-plants of its class, and one of the most beautiful, hardy, tall-growing and late-flowering perennial plants in cultivation.

New Orchids.

Rodriguezia Lindeni, Cogn.—Described as a new species, but in reality only a form of the ancient R. pubescens of Lindley, an elegant and very free-flowering little species.—*Journal des Orchidées*, iii., pp. 10, 12, fig. 1.

Cirrhopetalum Amesianum, Rolfe.—A pretty little species, native of Dutch India, introduced by Messrs. Linden, of Brussels, with whom it has recently flowered. It produces umbels of six to ten flowers, the united lateral sepals being light rosy purple with yellowish white margins and apex, the rest of the flower being yellow except the brownish red lip, and the ciliæ of the sepals and petals.—*Lindenia*, t. 314.

Stauropsis Warocqueana, Rolfe.—A very distinct species, introduced from New Guinea by Messrs. Linden, of Brussels, and flowered in the collection of Monsieur G. Warocqué, of Mariemont. It has a branching panicle, on which the numerous flowers are closely packed, their color light buff-yellow, with numerous light red-brown spots, and the lip white with some rosy spots.—*Lindenia*, t. 319.

Kew. *R. A. Rolfe.*

Foreign Correspondence.

The Experiment Garden at Wisley in England.

ENGLAND is enriched with several gardens of hardy flowers, and among them is the garden formed a few years ago by Mr. G. F. Wilson, F.R.S., at Wisley, in the charming county of Surrey. This delightful garden was designed for the growth of hardy plants in general and Lilies in particular. It is called Oakwood, to distinguish it from the cottage garden and grounds that surround Mr. Wilson's principal residence, Heatherbank, on Weybridge Heath. Many enthusiasts in hardy flowers travel to Wisley to see this garden in Primrose or Lily time. Wisley is approached by a drive of six miles from Weybridge Heath through characteristic scenery, now in its freshest and most charming spring dress. Oakwood was formed out of an Oak-copse; the natural character of the place has been preserved, and the result is a wild, picturesque spot, brilliant with flowers from the season of Primroses until the last Lily has opened its blossoms in late October. Sixteen acres of ground are covered with plants, each kind grown in large patches, so that the individual character and beauty are shown to advantage. In this comparatively small area there are no great scenic effects, but through the clearings in the trees appear brave masses of color; at this season stretches of ground are blue with the lustrous flowers of Gentiana acaulis, that grows here very freely.

A visit to Wisley may be made at any season of the year, save the dead of winter, in the certain hope that it will prove profitable. At the entrance to the garden one of the most conspicuous features is a hedge of the Japanese Rose (Rosa rugosa); the plants were raised from seed, and now form a splendid hedge with their spiny and leafy growth. The crimson fruits make a show during the summer and autumn, and from June until late in the year a scattered succession of the varied colored fragrant flowers is maintained. This hedge is one of the finest we have seen, and is useful as well as beautiful. Changes are always being effected at Wisley, and the garden is ever presenting some new feature. This will be a year for the Kæmpfer's Iris (Iris Kæmpferi), the beautiful species that the Japanese hold dear. Mr. Wilson has planted no less than 3,000 examples in a field practically outside the garden, and the finest forms will be selected from these, as they flower, for the adornment of the margin of the pond. I. Kæmpferi grows exceedingly well here, and in July it makes a delightful picture, large clumps being planted around the sides of the water, where they make a forest of luxuriant growth and bloom. It loves moisture, and does not mind even contact with the water, although it is often thought that this is fatal to the plant. The great point is to select flowers of good colors, as pure white or deep purple, many of the mottled and blotched flowers producing a poor effect. The season for this Iris and the several species and varieties of Lilium is perhaps the most suitable time at which to see Oakwood, although those who care for Primroses and Auriculas would choose the spring months. The Lily finds here a splendid home, with the best cultural treatment given to the bulbs; the result is superb growth, even of those kinds generally considered most troublesome and uncertain. The garden is occupied in part by Rhododendrons and other shrubs, and it is from their leafy undergrowth that the tall stems of the Lilies rise in profusion. On every hand there are Lilies, about half an acre or more being devoted to L. auratum and its varieties. The shrubs protect the shoots from frosts in early spring, and the soil that suits the Rhododendron agrees also with the Lily. Of course, many of the kinds are comparatively common, but for the choicer types Mr. Wilson has a series of bays, the sides of hurdles or furze to protect the stems from winds. Here L. Browni forms a magnificent clump and L. giganteum attains giant dimensions, the stems rising to nine feet in height or even more, and carrying a large mass of flowers rising from the base of rich green luxuriant leafage. L. Japonicum odorum promises to bear a profusion of flowers this year. L. Krameri, perhaps the most troublesome of all Lilies to deal with, under these conditions gives a wealth of flowers of a lovely rose shade differing in tone in individuals. Except for L. giganteum, no manure is given—a point of importance, as manure does harm to the general class of Lilies rather than promotes vigor of growth and flower.

Every turn reveals some treasure; the sides of a ditch were gay at the time of our visit with groups of Primula capitata, the double King-cup or Caltha (C. palustris flore pleno) kissing the water with its double golden-yellow flowers. Christmas Roses seed about in the moist soil, and form splendid clumps, while Primroses attain great perfection of form. There are few English gardens in which the common Primrose and its many varieties are more finely represented. The old double crimson, a very rare form, was flowering freely, and at the entrance to the garden the sides of the walk were gay with flowers of the most delightful colors and superb form. They are planted against cool gray stone for contrast, and this intensifies greatly the orange and yellow shades. The varieties here are very different from the Primroses one sees in ordinary gardens and too often at exhibitions. There are no dead, dull colors, mauve or washed-out pink shades, but the colors are deep and clear. This exemplifies the great improvement that may be effected by choosing only the best forms and colors for seed. The crimson, pink, rose and intermediate shades are of intense depth, and large masses make a glorious picture of color. They are planted by the ditch and under the shade of trees, where they obtain moisture and are screened from the direct rays of the sun. Possibly the blue Primrose attracts most attention, as being a flower of unusual color. Mr. Wilson has been several years in bringing to perfection the hardy blue Primrose, and has succeeded in raising flowers that please the artistic sense of color. This flower must not be placed in the same category with the artificial green Carnation that Londoners wear in their button-holes, for the reason, we suppose, that it is something out of the common, but which is essentially inartistic. It is an outrage upon beautiful Carnations to water the plants with dye to produce the horrid metallic lustre. The blue Primrose, although blue is never found in the varieties of P. vulgaris, and is foreign to the flower, is of great beauty, as remarkably free as the common wilding, and the clumps nestling against the cool gray stones are certainly beautiful. It is scarcely correct to call them blue; they are not the same intense blue as the Gentianella, but rather of a purplish violet tone, set off with a small central eye of deep yellow. Mr. Wilson has raised several varieties, of which Oakwood Blue is the best. It is a lustrous cobalt color, intensified by the small yellow eye, and from the first experiments until the advent of this form we have a gradation of shades, each new one displaying an improvement in color. We may, therefore, in time expect a flower that will be a deeper blue even than Oakwood Blue. But it will not be easy to eclipse this famous type in form; the flowers are full, broad and of excellent shape. The remarks that we have made respecting the Primrose apply to the self or alpine Auriculas. They are as perfect as the art of man can make them, the colors strong and deep, and the shape of the flowers as perfect as the ardent florist can desire. The deep maroon shades are delightful, but we get many tones from brilliant rose to almost black, set off with body colors which provide a rich or suitable contrast. It is only by rigid selection that such results are attained, weeding out the pale sickly colors, and retaining the best to raise seedlings from. In this way the strain, as we call it in England, becomes freed from the miserable weakly trussed varieties of poor washy colors that are utterly useless for giving beauty to the garden, although, unfortunately, occasionally seen at exhibitions under distinctive names.

The most brilliant hardy plant in late spring and sum-

mer is the Gentianella, or Gentiana acaulis, which is allowed to spread out into large masses. Mr. Wilson has several varieties of it, and, to use his own words, "the gorgeous blue of the type, especially when grown in full sunshine, might make it seem that any change in color would be a step in the wrong direction, but in this case, as the varieties are all of delicate colors, no comparison is provoked." These forms of this familiar plant were collected by his son, Mr. Scott Wilson, on the Swiss Alps, one having pale azure-blue flowers, another white, touched lightly with delicate blue, and in the third form they are tinted with pinkish purple color, which is of a deeper shade on the reverse of the throat. In such a garden as this a host of things find a place, and in one cool, shady, moist spot, near stones, the Soldanellas, as S. alpina and S. minima, were growing into a perfect mat, thriving in the moist vegetable soil with great vigor. These are usually provokingly troublesome to grow, and it is a pleasure to see them in rude health. Anemone Robinsoniana, among the trees, was delightful, its delicate color being in charming agreement with the natural wildness of the surroundings, and in a sheltered corner several varieties of Primula Sieboldi were presenting gay masses of bloom. P. Japonica, already bursting into bloom, forms a perfect carpet of growth by the side of the ditch, and there are few nobler plants than this for forming bold clumps of foliage, enriched in the summer with showy spikes of flowers. There are several varieties, but we prefer the deep crimson, as more showy and effective than the delicately tinted types. Muscaris vied with the Gentianella for creating a wealth of blue color, and it is when massed that the full beauty of such things is revealed. In late May one of the prettiest flowers was the Angels' Tears, or Narcissus triandrus, sometimes called the Cyclamen-flowered Daffodil, by reason of the shape of the flowers, which are not unlike those of a Cyclamen. It is grown in large colonies, the creamy white flowers carried gracefully on slender stems, and thrives with vigor in a warm situation and light soil. Near a large break of this Narcissus we saw a mass of the picturesque Rubus phœnicolasius tumbling over a hedge, and in the summer the effect of the clusters of scarlet fruit peeping out from their mossy calyx is interesting. Over Mr. Wilson's house, that stands on rising ground, and commands a view of lovely Surrey woodland, Reve d'Or Rose has thoroughly established itself, as has the delightful Button-hole variety, William Allen Richardson. The reintroduced Shortia galacifolia, whose appearance may be described as that of an enlarged Soldanella, is growing well in damp vegetable soil by the ditch-side, and this charming plant is likely to be much grown in England; the flowers are pure white, and the foliage of many shades of green and crimson.

Although Wisley is not a great place for trees, save the beautiful Oaks and Silver Birches that are the glory of the natural woodland, Mr. Wilson has planted many charming things, as Prunus Pissardi and the finest varieties of Pyrus. The deep chocolate leafage of P. Pissardi assumes a warm, rich purple-crimson as the season lengthens, and last year it produced an excellent crop of fruit, which is, however, hardly distinguishable from the foliage; it is not unpleasant to the taste, but would never, we should think, be grown for its excellence. The past two or three winters in England have been severe, and many of the tender shrubs, as Veronica Traversi, have been badly cut, but those that have survived show great vigor. It is interesting to note how curiously the frost affects plants. In one place a large bush is utterly killed, and another of the same kind a few yards away, and growing under the same conditions, remains untouched.

At Heatherbank and in the cottage-garden Mr. Wilson's interest in hardy flowers is everywhere manifest. At the side of the drive to the house, and in front of large banks of Rhododendrons, thriving clumps of the best varieties of Lilium auratum and L. tigrinum give pleasure. The plants failed by reason of the root-ridden ground through the Rhododendrons, until the plan was hit upon of sinking casks in the ground, with the bottoms knocked out, and filling them up with good loamy soil. This kept out the roots of the shrubs, and the Lilies seem to increase in vigor each year, although they have been in position several seasons. The effect of these brave clumps of showy Lilies is very fine, the dark leafage of the shrubs throwing into bold relief the handsome flowers. In a clearing made in a wood Lilies have also been planted freely, and in the partial shade and in the soil and moist conditions surrounding them are the picture of health.

These few hasty notes upon a delightful English garden of hardy flowers will doubtless be read with interest by readers of Garden and Forest, many of whom have possibly visited Wisley to note for themselves Mr. Wilson's experiments. It is called an experimental garden, but this is a harsh word for acres of hardy plants, each allowed to grow its own sweet way and tell its own tale of beauty in foliage, habit and flower.

England. *V. C.*

Cultural Department.

Hardy Narcissus.—I.

THE season of these spring-flowering bulbs commenced here about the 20th of April with N. bicolor præcox (Hartland). There were blossoms of this variety open seven days before any other. These were quickly followed by Ard-Righ, Countess of Annesley, Golden Spur, Henry Irving and General Gordon. All of these varieties are Ajax or Trumpet Daffodils, and they are also all yellow. With us these kinds came into flower in the order named. I learned after the bulbs of Ard-Righ were planted that "garden-soil kills them." Ard-Righ, Leda, and the white varieties, N. Moschatus, N. cernuus pulcher, N. pallidus præcox and William Goldring, require conditions different from those under which the rest of the family thrive. They are hardy; the trouble appears to be with their digestion, and rich soil seems too strong a diet. N. Moschatus is fast dwindling away. Next fall all these varieties will be planted among grass. The flowers of N. cernuus pulcher are very chaste and beautiful, as are those of William Goldring, which is later flowering than the other varieties of the section known as the Swan's-neck Daffodils. Leda was a complete failure; from the few bulbs planted not one perfect flower was produced. Of the Ajax varieties Countess of Annesley is the best with us; it is almost as early as Ard-Righ and Golden Spur, and has a much more expanded trumpet. It does remarkably well in ordinary garden-soil, and it has also the merit of being cheap. The old N. trumpet maximus is perhaps the richest-colored Daffodil grown, and is good in every way. Though not an early-flowering kind, it comes in with Empress and the best of the Bicolors. N. rugilobus is free-flowering and does well. Bulbs planted two seasons have this year produced five to seven flowers to a bulb. This variety resembles Emperor, but is smaller; the outer edge of the trumpet is beautifully set at right angles as if hammered out.

The Saragossa Daffodil is an early-flowering variety, but is much too dwarf for border-culture, the first showers bespattering the flowers as they scarcely reach more than three inches above the soil. It would be a good variety for pot-culture, owing to its earliness, and planted in a rock-garden it could be brought more on a level with the eye. This variety is of Spanish origin, and flowers freely. King Umberto is distinct from all others in having a deep yellow stripe down the centre of a paler yellow perianth; the trumpet is large; it is a desirable variety, though of no use for cut flowers. Golden Plover, General Gordon and Emperor may be called second-early varieties, as they flowered about May 1st. It is curious to note how differently plants behave in this climate from that in which they were grown for sale. N. bicolor præcox came first, but in regular order, but N. muticus, which was expected to be the last, was a very close second, and was in full bloom with the earliest kinds.

It was intended to have a nice lot of very late-flowering bicolors, and one hundred bulbs were planted. Our compensation lies in the fact that no two of the flowers were alike; some of the perianths were twisted, some were not, and the length of the rich yellow trumpet varied a good deal. All were alike in being cylindrical and cut off abruptly at the end. In this variety the flowers developed somewhat before the foliage, but next season they may behave differently. It is a very interesting kind to grow both on account of the shape and varia-

Fig. 51.—Boltonia latisquama.—See page 268.

bility. The N. Johnstoni varieties are high-priced, and will probably never become popular even if cheap. Mr. Johnston once sent us a small importation direct of what he called N. Johnstoni. There are now several varieties of this type, and the kinds vary in themselves almost as much as between one another. Mr. Johnston stated that the bulbs should be protected from frost, but they are quite hardy, and do well in the open ground. It is scarcely necessary, in this connection, to say much regarding Emperor, the finest yellow Trumpet kind we have. Our spring season has been one of exceptional dry-

ness, there having been only one slight shower during six weeks. The flowers have consequently lacked substance, and in some cases the coloring was deficient, more especially in the Leedsi and Barri sections, where the cups are stained with orange in the normal coloring.

South Lancaster, Mass. *O.*

The Rock-garden.

BEAUTIFUL effects may be secured by the use of rough stones and stumps in floral plantations, and a large variety of plants which continue attractive during the greater part of the year may be well grown in a carefully contrived rock-garden. Nearly all the dwarf plants ordinarily used in decorative gardening are suitable for the rock-garden, and by a judicious use of the materials employed in its construction suitable positions may be provided for the many choice plants that will not flourish in the general garden, or anywhere, indeed, but in such places as closely resemble the dry, almost barren characters of their native habitats. No form of horticultural art is more attractive and interesting, and the plants are generally inexpensive, though some rare kinds are difficult to duplicate.

The various species and varieties of the extensive genus Narcissus make desirable groups, as do the Snowdrops, Squills, Tulips and other early spring-flowering plants. The same may be said of the Fritillarias, of which there are many varieties. The spring Snowflake (Leucoium vernum) is now out of bloom, but its summer relative, L. æstivum, flowers freely in late May.

The red and yellow flowers of Aquilegia Canadensis, the Canadian Columbine, are very attractive, and the plant is one that takes kindly to any position short of the bare rock. It attains a height of about two feet in good soil, but its growth is much stunted where the earth is poor and scanty. It is a graceful plant, and flowers freely in any case, spreading rapidly by means of the seeds, which are annually ripened in large quantities.

Trillium grandiflorum lingers on, though the flowers are not so numerous as they were earlier in the season, and those that remain have become somewhat tinged with red. This Wood Lily is one of the most effective early-flowering plants for moist and shady situations, as at the foot of the rockery. Similar sites should be accorded the lesser Periwinkle (Vinca minor) and Orobus vernus. Both of these plants are in fine condition in May, and the Vinca rambles about over the rocks without the least regard to regularity. Its pretty blue flowers and deep green foliage are also serviceable in forming an exquisite mantle in places where the gloom is so dense that most other plants will not live. There is nothing better than V. minor for a shade plant, and where it fails experiments with other plants are generally futile. It is equally satisfactory in an open position.

Orobus vernus is a highly meritorious plant, and one that well deserves more attention than is usually given to it. It has been known to horticulturists for over two centuries, and although of easy culture, it has never been very common. A shady and rather dry position suits it best, and the soil should be loamy and of medium quality. It is about twelve inches in height, and of erect, compact growth. The numerous stems are furnished with light green, pinnate leaves, and the purplish pea-shaped flowers are borne profusely in racemes at the top throughout the spring months. It is a native of southern Europe, and easily propagated from seeds in spring, or by division of the roots in autumn.

The Aubrietias are very gay in dry, elevated crevices. They are all dwarf and of compact habit. The purple flowers of A. deltoidea are very pretty, as are those of A. grandiflora, which are lilac color and of larger size. A. Græca has an exceptionally trim appearance, and the flowers are of a rich reddish purple color and good size. The flowers of A. Hendersoni are of deep, rich purple color; those of A. violacea are somewhat paler. But the gem of the group is undoubtedly A. Leichtlini. It is extremely floriferous, and the blooms are large and of a bright rose hue. These plants are perfectly hardy, and require little attention when once thoroughly established. But with the exception of A. violacea, which seeds freely and is therefore easily increased, they are all difficult to propagate. The best method I know of is to divide the tufts very carefully after the flowering season, and plant the pieces in a frame, using light, rich soil. Shading will be found beneficial in very bright weather until growth is started, and water should be given when necessary. The new plants will be ready for their permanent places early in autumn, and will flower during the ensuing spring.

The evergreen Candytuft (Iberis sempervirens) is a mass of snowy bloom in May. It is a plant of somewhat shrubby character, about a foot high, and of thick, spreading growth. At other times the dark green leaves have a peculiarly refreshing appearance, but now they are almost totally hidden by the sheet of flower-heads. It is quite a hardy plant and likes free exposure to sunshine. Cuttings of the young wood taken in summer afford the best means of propagation. These should be placed in sandy soil, and kept in the shade until rooted.

Scilla campanulata is in bloom now. The leaves are strap-shaped, decumbent and about a foot in length. The Hyacinth-like scape is erect, from twelve to fifteen inches high, bearing numerous drooping, bell-shaped flowers of pale blue color at the top. It requires good, sandy soil, and large masses give a charming effect in partial shade.

The Iceland Poppy (Papaver nudicaule) is extremely handsome in its various varieties, the flowers of which are either orange, white or yellow. The plant is dwarf, and forms dense tufts of pale green, finely cut leaves. The cup-shaped flowers are from two to three inches in diameter, and they are borne singly at the top of erect slender stems, which are from nine to eighteen inches high, and bare from base to extremity. This plant is a native of the northern parts of Europe, and stands through our severest winters wholly uninjured, provided it is given a sunny aspect, where water will speedily pass away from the roots. The plantations of this delightful Poppy should be renewed at least every third year, as the young plants are more certain to give satisfaction than those advanced in age. Seeds ripen freely, and from these an abundant stock of plants may be readily obtained by sowing early in spring. The plants thus raised will flower in late summer and the following autumn, and in both spring and autumn during succeeding years. The small brick-red or white flowers of the dwarf P. alpinum are interesting, but not nearly so beautiful as those of P. nudicaule, and they are insignificant beside those of the scarlet P. orientale, which will bloom a week hence.

Omphalodes verna, the creeping Forget-me-not, is another pleasing little shade-loving plant. It is a native of southern Europe, and was introduced into English gardens in 1633. The creeping stem is furnished with ovate leaves on petioles two or three inches long, and the intense blue, spreading flowers, with white starry eye, are about twice the size of an ordinary Forget-me-not, and are borne above in short racemes. Propagation is quickly effected by division, and the plant spreads rapidly where the soil is good and the situation favorable to its development. The pale blue flowers of Myosotis sylvatica, one of the true Forget-me-nots, are quite showy in masses at this season, and its white variety is also useful in the way of diversity. Although a perennial, it is best when treated as an annual. The seeds should be sown in autumn, keeping the plants under cover during the winter, and transferring them to the open in early spring.

The commoner plants in bloom include Arabis albida, Armeria maritima, Corydalis noblis and Dicentra spectabilis. These are universal favorites, and need no description.

Cambridge, Mass. *M. Barker.*

Garden Notes.

I AM now certain of a matter of great importance to small-fruit growers, namely, that the development of berries in the fall exhausts the canes for the next year's regular crop. 1891 was peculiar in showing all over our Raspberry-fields an effort to produce a second crop of fruit. I could pick a quart at any time in October, and had freezing weather held off two weeks longer there would have been several crates of red raspberries ripe at one time. These fruit-stalks should have been promptly pruned off. This could have been done in a few hours with hedge-shears or with fruit-clippers. Our Raspberry-canes have this spring budded very slowly, and the ends of the stalks are devitalized. This was not due to cold weather, as the winter did no damage to more tender plants. The Cuthbert, with me, endures extreme weather.

The same result followed a large development of Strawberry-blossoms in the fall of 1888. I do not believe we can do better than to remove such flower-stalks with great promptitude. The fall-bearing Blackcaps are worthless for summer fruitage. I have carefully looked over my fields and in every case a hill that had a fall crop is worn out or dead. A fall-bearing berry is useless for market purposes, as there is no call for berries out of their season.

We had occasion to pull up a small Locust (Robinia Pseud-acacia) which had started in my greenhouse, and found on the roots a series of small tubercles. The next day we came on the same tuberculous growth on the roots of a clover, which was pulled from a Strawberry-bed. I had read the biological discovery that plants of the Leguminosæ family were able to extract nitrogen from the air, but had not so far associated the fact with these nodules. It is a matter of ex-

ceeding interest to farmers, and one easily verified, that all plants in this family are affected by a parasitic growth such as I have described. The disease is caused by a bacterium which assails the roots of the plant and then grows out into these very pretty nodules. Whereas many bacteria are injurious, if not fatal to life, this one adds a new and extraordinary power to the plant attacked, and it is enabled by some means not yet understood, but through this parasitic agency, to extract nitrogen from the air. With this explanation it is easy to understand why Clover increases land fertility instead of exhausting it, and why plowing under a crop of Clover-roots is of so much value to the land. Every root is a nitrogen extractor. Beans have the same power, and all other members of the family leguminosæ. It is very probable that this same power is added to the natural functions of some other plants, and the field of examination is extremely interesting. Our boys and girls should be taught biology, and especially in the departments of bacteriology and entomology.

Clinton, N. Y. *E. P. Powell.*

The Garden in May.

TOWARD the end of this usually fickle month, the ordinary suburban garden blossoms out with tender plants which until this time have been carefully housed or have been bought en masse of the florist. These plants, observation will show, have a look of pained surprise at being moved to unaccustomed quarters, and it will be early summer before they are in harmony with their surroundings. No garden is complete without some of the invaluable tender plants, yet it seems incredible that any one should depend entirely on them, as is so frequently the case. A good garden is one which has the best obtainable plants at all possible seasons, and the merits of the plants are quite distinct from their being tender or hardy. If a certain class of plants can only be had in the open in summer, it would seem folly to allow the garden to remain a barren waste during the other three seasons. To lovers of nature, among which gardeners are usually classed, often, it must be feared, incorrectly, the tender foliage of the spring-time is one of the greatest charms of the early year. A garden of hardy plants at that time is a continually changing study in form and coloring, even if the many beautiful flowers of the season are not considered. That they are not more generally grown is perhaps due to this class of plants being less freely offered by the trade, rather than to a want of appreciation of them. The average plant-buyer is dependent on catalogues for his garden lore, and the plantsman has a tradition that "there is no money in them."

Not to speak of bulbs and the various plants which have been mentioned in GARDEN AND FOREST as the season has advanced, there are countless plants which are available as permanent occupants of the border, to appear with their various attractions as the seasons advance. With tender plants made a secondary feature, and hardy plants and bulbs the main reliance, one has a garden which will give generally a minimum of care, with usually less expense, and, if well considered, it will prove much more interesting and attractive. To form such a garden requires judicious buying, and it is well at first to confine purchases to a few well-known families of plants, ordinarily such as are cultivated largely by hardy plantsmen, and can be had at a low price. For example, as I write, the most prominent plants in the garden are the Columbines and the hybrid or German Irises. Columbine-plants may be bought, but a collection of German seed, such as is sold by the florists, will, if planted now, give flowering plants next year in wonderful variety. Mostly beautiful flowers these are, and there are also some which it will be no hardship to lose. There is a great difference in effectiveness among the different varieties. If the grower finds that the kinds bought give him pleasure, there are many other species to be selected and grown. If not satisfactory, the tentative experiment has cost little, and has at least been paid for by the pleasure of anticipation. The rhizomes of German Irises may be bought of most plantsmen in great variety at a very reasonable price, and they rank among the handsomest of garden-flowers.

Irises are called "the poor man's Orchids." There are few Orchids with flowers as handsome as some of the best of the Irises, and they have, besides, a nobility and grace all their own. They increase rapidly by creeping rhizomes, and soon give great masses of flowers. There are an endless number of species of this family, with widely divergent flowers and habits, and if subjects difficult of cultivation are desired, Irises can furnish a fair number to test the ingenuity of the most patient gardener.

Oriental Poppies are just commencing to show color above their graceful Acanthus-like leaves. It is unnecessary to say to any one familiar with Oriental Poppies that they alone furnish a garden in their season, everything else paling before their vivid fires. To others it may be recommended as a desirable plant to be carefully placed. But a vision of Larkspurs, Campanulas, Foxgloves, Spiræas, Phloxes, Pæonies, Coreopsis, Grasses, etc., remind one of the wealth of hardy things to come before the Roses are fairly represented, though the Japanese Rose has already opened the season with its chastely beautiful flowers.

Elizabeth, N. J. *J. N. Gerard.*

The Bachelor's Button.—Various plants are known under this common title of Bachelor's Button. The name is a very old one, having been in use over three hundred years ago, with particular reference to a double-flowered form of Ranunculus acris, the Golden Bachelor's Button. It is mentioned by Gerard in his famous Herbal, and that author attributes its origin to the resemblance which the flowers bear to the jagged clothes buttons formerly worn in Britain. Other writers, however, according to Dr. Prior, declare that a habit of country fellows to carry these flowers in their pockets to divine their success with their sweethearts, gave rise to it. The other plants to which the name is given may be distinguished as the White, the Red, or the Violet Bachelor's Button; the plants are botanically Ranunculus aconitifolius flore pleno, Lychnis sylvestris and Scabiosa succisa. The last two plants are scarcely known in gardens, nor are they desirable except as curiosities, since there are many other more beautiful species of the same genera now in cultivation. Ranunculus acris, the Buttercup, is already a common weed in many parts of the United States, having been naturalized from Europe. Its double form is a much-esteemed garden-plant, flowering in May and June, and like the species in everything but the flowers, which are extremely useful for cutting. It is easily grown, and looks well in either the border or the rockery. Propagation is effected by dividing the roots. The White Bachelor's Button is a plant of similar utility and requirements, and usually blooms about a month later.

Cambridge, Mass. *M. Barker.*

Correspondence.

The Winter-killing of Conifers.

To the Editor of GARDEN AND FOREST:

Sir,—I have observed some correspondence in your journal as to the winter-killing of certain coniferous trees, and I am constrained to say that in the Arboretum few of the Retinosporas of any variety have escaped burning more or less. The Arbor-vitæs have suffered greatly, and I have been compelled to cut away more than half of the growth of many quite large specimens. Even the Red Cedar has suffered considerably, and I never saw young White Pines in a worse condition, even plants of considerable size being badly scalded. A great many of the Balsam Firs, which ought to be hardy enough here, are nearly dead. Up to the 1st of March these trees all looked well, and my opinion is that much of the damage was done by some very warm dry weather in April, with high drying winds, followed by several severe nights, when ice was formed an inch or more in thickness. Genistas, Cytisus and Furze, wherever they were covered, are in a pitiable condition, while others which were left to themselves have come through safely. Daphne Genkwa, which has always survived the winters here with a light covering of earth, has succumbed this season. The Ligustrums, with the exception of L. Ibota and L. media, a dwarf form from Japan, have been hurt considerably, while Weigelias, which usually winter-kill badly with us, are in prime condition, and show hardly a dead branch. The varieties of Berberis vulgaris have suffered, while B. Thunbergii, B. Sieboldii, B. Amurensis and others from Japan and China are in fine form. The Cotoneasters, which are usually a little tender, show no harm. It is difficult to find any theory which will account for vagaries like these.

Arnold Arboretum. *Jackson Dawson.*

To the Editor of GARDEN AND FOREST:

Sir,—The article from Mr. H. H. Hunnewell in a recent number of GARDEN AND FOREST, relating to the loss of conifers, has been read with much interest in this vicinity, where the loss of fine evergreen trees and shrubs during the past season has been quite considerable. Mr. Hunnewell's broad experience and intelligent observation give his statements special value and interest.

At my own grounds some excellent specimens of Retinospora squarrosa and R. filifera were materially injured, and from observation in other places, the past season has been one of the worst in several years, for many kinds of conifers. The loss of good specimens of Retinosporas within fifty and one hundred miles of New York has been considerable. Pines, Spruces, etc., have fared better, and but few losses are to be noticed even among the Hemlocks and Arbor-vitæs, which frequently suffer most in unfavorable seasons in this locality.

Considering the large exposed foliage of Rhododendrons, these plants have suffered comparatively little, although specimen plants at some of the fine estates on the Hudson and other places have lost a part of their foliage. It is of advantage to arrange all this class of plants in masses in beds or borders, where the conditions are favorable for retaining moisture in summer and winter.

Mr. Hunnewell is fortunate in having the large specimens of the varieties of Retinospora and Thuyopsis he mentions. Many consider these varieties less hardy than the more common evergreens. Such results in the severe climate of Wellesley indicate that the right treatment has been given, and that the right plants are in the right place.

It is generally considered that the cold weather and unfavorable winds of winter and spring are the main causes of the loss of most evergreens. If this is a popular fallacy, and we come to a better understanding of the importance of a normal condition of moisture during summer and autumn, it will be comparatively easy in many cases to adopt remedies to avoid the loss of these beautiful trees.

New York. *Fred. W. Kelsey.*

The Waukegan Nurseries.

To the Editor of Garden and Forest:

Sir,—June has come, and it finds the Apple-blossoms hereabout just opening and the pink leaves of the White Oak no bigger than squirrels' feet. Rain fell two days out of every three in May, and practically there has been continuous wet weather since February, so that looking from the car-window a visitor sees water flowing in the furrow after the belated plow in one field, and the farmer in the next one planting corn in the mud. I rode out to Waukegan to see Robert Douglas, and found the veteran nurseryman in his overcoat. To an inquiry whether this was a fair sample of early June weather in Illinois, he replied that no spring so cold and wet had been experienced in this vicinity since 1844, which was the year when he drove out here in a buggy from the eastern slope of the Green Mountains. In mid-June then all the country was under water about Chicago, and in the young town itself a few wagons were moving through the streets, while many more were fast in the mud. He managed to find a place to sleep on the floor of a hotel, the earlier comers having preëmpted the dining-room tables, but his horse stood out all night tied to a post without a mouthful to eat, for the farmers could hardly get into town without swimming, and any attempt to haul oats or hay was out of the question. The next day he reached drier land, and he kept on through different depths of mire until he reached Waukegan, where his horse gave out, and left him stranded. Practically his home has been there ever since, although he is known to almost every one between the two oceans who is interested in arboriculture, and of the trees from nursery seedlings now standing in forest-plantations in the United States a greater number have been raised by him than by any other man; in fact, until within a few years more forest-tree seedlings were raised by him than by all other nurserymen combined.

When the Waukegan Nurseries were founded, nearly half a century ago, Ellwanger & Barry had recently established the Mount Hope Nurseries; but west of Rochester the only establishments of sufficient size to warrant the issue of a catalogue were those of Hodges, of Buffalo; Custed, of Cleveland, and Elliott, of the same city. Mr. Douglas began at the outset to raise seedlings for Apple and Pear stock, and although he was warned that he never could compete with imported Pear stock, he was soon sending large quantities of excellent material to the older American nurseries in the east. In 1863 he had fifty acres of Apple-seedlings, which he sold at a year old for $8.00 a thousand. Meanwhile he had begun the pioneer work of raising deciduous forest-trees from seed, and for a long time he had little competition. In later years, however, these trees have been produced in enormous quantities on the cheap land farther west, and comparatively few species are now produced on a large scale at Waukegan. He still grows many Soft Maples and Elms and Birches for ornamental planting, and great blocks of Black Cherries, Catalpas, Green Ash and White Ash, for forest-planting.

The raising of coniferous trees from seed, however, requires special skill, and the production of these trees continues to be the leading specialty at Waukegan. After many experiments and some costly failures Mr. Douglas learned that the methods pursued in the Old World could not be trusted in our dry and hot climate, but he finally succeeded in securing proper conditions of shade and moisture by various devices, and especially by covering high frames with the leafy boughs of forest-trees, and since then his success has been assured. Constant watchfulness is required, since young seedlings remain sometimes as long as three years in the seed-bed before they are transplanted to the nursery rows, but the vigor of the trees raised here has been tested all over the country, and the luxuriant growth of the young trees now standing in the nursery bears witness to the intelligent and thorough way in which they are brought forward. White Pines are raised here by the million. The Red Pine is produced in smaller quantities, not because it is more difficult to grow, but because the demand for it is so limited. Buyers seem slow to recognize the superior merit of this tree, both for forest and ornamental planting. It requires greater care in starting, but it is worth all the trouble it costs, and the time must soon come when it will be very largely used not only for its beauty in parks and private grounds, but for its usefulness in forests. Special attention is devoted here to raising the hardy evergreens from the Colorado Mountains, particularly the Douglas Spruce, the Colorado Blue Spruce (Picea pungens) and the beautiful Fir, Abies concolor. Mr. Douglas was among the earliest to secure seeds of these trees, and collecting them as he does in regions where the winters are severe and the summers are dry, the seedlings prove perfectly hardy. Nothing can be more beautiful than the long stretches of Picea pungens which are standing at an even height of four and a half or five feet in the nursery rows. These trees give perfect satisfaction wherever they are used, and even in parts of Minnesota where the Box Elder and the Green Ash fail, they endure the winters without harm. The Douglas Spruce is a still more beautiful tree which is just beginning to be appreciated, and long rows of specimens, from six to eight feet high, already show its remarkably graceful habit and soft foliage. The White Spruce is another tree which is very largely grown, and it is much more satisfactory under many conditions than the Norway Spruce. All the hardy conifers, native and foreign, are grown here in quantities, and the scale on which this business is conducted can be seen from the fact that as many as five million seedling trees have been sold in a single year.

At different times we have given accounts of the forest-plantations which have been made by the firm of Douglas & Sons under special contract. Under these contracts the firm agrees not only to furnish the trees but to prepare the ground for them, to plant them four feet apart each way, and to take entire charge of the plantation for a number of years and deliver the forests to the owners after each acre contains a guaranteed number of trees of a given size which completely shade the ground. When the trees have reached this size it is assumed that they can hold their own against the encroachments of prairie-grass and weeds. The advantages of this arrangement are that the work of planting, as well as the care of the trees while they are young and feeble and need the most intelligent attention, is confided to trained hands. Very few people in the country have planted a hundred acres of forest-trees in a single body, but under this arrangement Mr. Douglas has planted many larger tracts, one or two of which cover a square mile in area. The firm has planted 3,000,000 Catalpa-trees in a single county of Kansas.

Of course, so close an observer as Mr. Douglas would find varieties of trees which have special merit, and some of the specialties of the Waukegan Nurseries, like the Arbor-vitæ known as Douglas' Little Gem, the Waukegan Trailing Juniper, the Golden Abor-vitæ and a silver-tipped form of the same tree, are well known to planters. Of special interest just now is a large block of what Mr. Douglas calls the Large Cone Balsam. The original trees came from the Wolf River, in Wisconsin. Some of them, which have attained a height of some thirty feet, are standing on the beautiful lawn in front of Mr. Douglas' old place, and they are certainly splendid specimens. The lower limbs have not died away, as is usually the case with the common Balsam, but they are furnished fully to the ground. The leaves are longer and the cones are much larger, and they are so different from the common Balsam that they can be readily detected at a distance even in the seed-beds. Altogether, the tree is distinct and beautiful, and promises to be of great value in ornamental planting.

But, after all the treasures of the Waukegan Nurseries have

been studied, the visitor will find their highest interest centring in the personality of their founder. Mr. Douglas carries his eighty years so lightly that he seems to have discovered the fountain of perpetual youth, and he looks as fit to set out for California now as he was in 1849, when he started for the Pacific coast with an ox-team and, having lost them in a swollen river, tramped on foot to his journey's end. There are few parts of this country where the native trees have not been studied by his observing eyes, and his stores of practical knowledge in his specialty are almost inexhaustible. His memory retains impressions with remarkable tenacity, and his picturesque way of recounting the experiences of his long eventful life is a source of unfailing pleasure to all who meet him. Above all, his broad public spirit, his transparent honesty, his manliness and gentleness, command universal respect and affection.

Chicago. *S.*

Recent Publications.

Les Fleurs à Paris: Culture et Commerce. Par Philippe L. de Vilmorin. Paris, J. B. Ballière et Fils. 1892.

This little book will, at the very first sight, interest all growers of plants by reason of its author's name; for Monsieur Philippe de Vilmorin is not only the son of Monsieur Henri L. de Vilmorin, the learned and famous French horticulturist, but represents the fifth generation of the Vilmorin family which, in one or more of its members, has devoted itself to the culture of plants, and more than any other single family has raised French horticulture to its present high position.

His father, in a brief introduction, explains the origin of his book. About a year ago, it seems, Monsieur Henri de Vilmorin was asked by the French Association for the Advancement of Science to speak about "Cut Flowers" at one of the conferences which this association holds each winter in Paris. Afterward the Messrs. Ballière, publishers of the *Bibliothèque Scientifique Contemporaine*, asked him to elaborate the substance of his lecture, so that it might form a volume in this collection of useful popular manuals. But as other demands upon his time were too numerous he turned the task, together with his own materials, over to his eldest son, whose work now lies before us. The father asks the reader's indulgence on the ground that this is a maiden essay, published before the writer had entered his twenty-first year. But one does not feel that his plea needs to be insisted upon, for the young man has his full share of the widespread French aptitude for graceful literary expression; and, of course, one can trust his facts as implicitly as though his father's name stood on the title-page instead of his own.

The book is intended as a guide for the amateur horticulturist, and, consequently, the greater portion of it consists of descriptions of plants adapted for ornamental use in the gardens and greenhouses of France. These are grouped as "Annuals," "Biennials," "Perennials," "Bulbous Plants," "Hothouse Plants" (with a special treatise on Orchids), "Trees and Shrubs," "Flowers of the South," "Flowers and Grasses to be dried for Winter Bouquets," and "Foliage and Ornamental Greens." Each division is full enough to satisfy the needs of the most enterprising amateur; the plants named in it are chosen with knowledge and taste; simple notes as regards their culture are appended, and excellent little illustrations explain their aspect. Many hints may be gathered by American horticulturists from these pages, although, of course, their indications are not always adapted to our very different climatic conditions, and he will miss certain plants which, favorites here, are less generally known in Europe.

But the most interesting part of Monsieur de Vilmorin's book for transatlantic readers is that which treats, in a general way, of the flowers of Paris—what they are at successive seasons of the year, where and how they are produced, and in what manners they are sold. It is in northern countries, as the author explains, that the trade in cut flowers and plants is regularly organized, and assumes the proportions of a national industry. In southern lands flowers grow everywhere at all seasons of the year, and, of course, are everywhere offered for sale. But the traffic in them has not been obliged to regulate itself as has such traffic in regions where frost and snow prevail during many months of the year. The greatest flower-markets, therefore, are those of Paris and London; but only in recent years has Covent Garden flower-market grown to an importance at all comparable to that of the chief Parisian market, while in Paris the trade has so largely developed of late as to necessitate the establishment of a number of smaller markets. In America, on the other hand, says the author, although flowers are used in winter as profusely as anywhere in the world, "people have hardly the time to frequent flower-markets. They want the commodity brought to their doors. So the large towns are abundantly supplied with flower-shops, which often extend themselves largely over the sidewalks."

Monsieur de Vilmorin's description of the great market at the Halles Centrales is so interesting, and will doubtless be so new to the majority of our readers, that we reserve it for somewhat full translation at another time. Meanwhile, however, we can note his enumeration of the chief flowers sold in Parisian markets and streets at the different seasons of the year.

"In the fine days of spring," he says, "before Paris begins to empty itself, the markets are in their full splendor, . . . and purchasers are simply embarrassed to choose between flowering bulbs, early Roses, Deutzias—the favorite ornament of the month of May—the first Pinks, Chinese Primroses, Cinerarias, which have not yet gone out of bloom, innumerable Gilly-flowers, Forget-me-nots, Indian Azaleas, which are at the height of their season, Gardenias, and a hundred other varied plants. At the same time armfuls of Lilacs, Mignonette and Narcissus attract attention by their perfume, and great baskets of growing Pansies, double Daisies, Anemones and Ranunculi offer themselves for the decoration of little city gardens and window-boxes. In the middle of summer China Asters rule, with Pinks of every shade, Gladioli, now so prodigiously varied in color, Agapanthus, Gauras like white butterflies, Amaranths of every form, Chinese Perillas with dark brown foliage, Lillies (Lilium speciosum) in their red and white varieties, golden Lilies of Japan with their powerful odor, Tuberoses as strongly scented, Plumbago Capensis of tender blue, Madagascar Periwinkles, and the Gypsophyla and Stevia, which give lightness to bouquets. Then, piled in baskets, are Mimulas, Verbenas, Balsams, Ageratums, Lobelias, Nemophilas and all the charming annual flowers of the open ground. The autumn is now wholly given over to Chrysanthemums. . . . Nevertheless, after them may still be seen Asters, Laurustinus, Christmas Roses, and soon Persian Cyclamens, which begin the series of winter-blooming hot-house plants. Toward Christmas the winter-foliage decorations begin to appear—Mahonias bronzed by the cold, Hollies with their pretty red berries, the spiny Butcher's Broom, tufts of Mistletoe bearing their viscous fruits, and, coming from the south, sprays of the Japanese Spindle-tree and the American Pepper-box (Schinus molle) with its clusters of pink berries."

We know of no book of just this character which has been prepared in this country. But we think that one similarly moderate in size and price and popular in form, which should describe the traffic in flowers and plants that goes on in New York, the places where they are grown and the manner of their cultivation, and should give sensible lists of such plants as are best suited for amateur cultivation, might find a wide public of interested readers. At present, American amateurs have to depend upon the information contained in horticultural journals, where, of course, they may not always be able to put their finger upon such items as are most wanted at the moment; and upon trade catalogues, in which, very naturally, everything is named, everything is equally recommended, and a very undesirable degree of stress is laid upon novelties. The materials from which the American amateur may choose are even richer than those that lie ready to the hand of the European amateur; and his need of such guidance as is supplied by a book like Monsieur de Vilmorin's is greater than the European amateur's need in exactly the same proportion. To choose his materials is the first and most important step which he has to take; and, at present, it is perhaps the most difficult of all steps to take with wisdom.

Notes.

Mrs. Katherine Brandegee recently printed in *Zoe* a "Catalogue of the Flowering Plants and Ferns growing spontaneously in the city of San Francisco," which names 485 species, citing their localities. Notes of an instructive sort are added, and also a list of local Mosses, collected chiefly by Mr. H. W. Bolander.

Owing to the lateness of the season, the annual Rhododendron show of the Massachusetts Horticultural Society has been postponed until Friday and Saturday, June 10th and 11th. A special prize for fifty trusses of not less than fifty varieties, offered by Mr. Francis Brown Hayes, will be competed for at this time. On Saturday, August 6th, a silver vase valued at twenty-five dollars will be awarded for the best display of Sweet Peas. This is one of the prospective prizes of the society, and must be taken by the same person or firm twice in three consecutive years. This is the third year that the society has offered this prize.

Although as a flowering tree Maackia Amurensis is very inferior to its relative, the North American Yellow-wood, Cladrastis lutea, it is very beautiful when the young foliage is expanding, and is worth planting for the effect it produces in early spring when the young leaves have a peculiar gray-green or mouse-color, and are very unlike those of any other hardy tree or shrub. Maackia is now well established in many northern gardens, where it flowers profusely late in June, the minute pea-shaped yellow-green flowers being produced in slender upright spikes which make a pleasing contrast with the rich dark green foliage. The seed-pods are small and do not compare in beauty with those of the Yellow-wood.

Judged by the specimen now flowering in the Arnold Arboretum there is no shrub more beautiful at this time than Rosa grandiflora, with its great single white flowers as handsome as those of the Cherokee Rose and far more fragrant. This fine plant, in spite of the fact that it is an old inhabitant of gardens, is rarely seen in these days, although the growing taste for single-flowered Roses must soon bring it into general cultivation. In 1825 it was figured in the *Botanical Register* (t. 888) by Lindley, who thought it might have come from Siberia, although he was uncertain of its origin. It is of the same section as the Scotch Rose (Rosa spinosissima), but far excels all the varieties of that handsome plant in the size and beauty of its flowers and in the boldness of its dark green foliage.

It would be delightful, says "The Listener," in a recent number of the *Boston Transcript*, "if we could have an opportunity to see a garden laid out and kept up exactly in the Japanese manner. It would be an attractive idea to have a Japanese garden in one corner of Franklin Park. There is a sufficient number of Japanese trees and flowers which are hardy in this latitude to make it possible to furnish a garden entirely with Japanese vegetation; and the gardeners of Japan are famous for making beautiful gardens in a very little space, so that not much room would be needed. We could not have avenues of Plum or Cherry trees five miles long all at once, but we could unquestionably get some very instructive suggestions, and it would be very interesting to everybody."

Decades of North American Lichens, prepared by Clara E. Cummings, associate professor of botany at Wellesley College, and Mr. A. B. Seymour, of the Cryptogamic Herbarium of Harvard University, can be obtained by addressing Miss Cummings at Wellesley, Massachusetts. The first thirty or forty species of the series will be ready for delivery in June. These early decades will contain many of the commonest species, well suited to beginners in the study of Lichens, teachers and classes in high schools, academies and colleges. The specimens will be enclosed in envelopes or glued to small sheets ready for mounting in the herbarium, and will be accompanied by printed labels, all critical species being verified by comparison with the Tuckerman Herbarium. The price, seventy-five cents for each decade, is unusually low.

A paragraph in the *Bulletin of the Torrey Botanical Club* for May, calling attention to an article by Monsieur A. Franchet, recently published in the *Journal de Botanique*, says: "It is interesting to note the discovery in the Chinese province, Yun-nan, at an altitude of 3,200 metres, of a Kelloggia that closely resembles K. galioides, Torrey. The habitat of the latter is in the coniferous forests of the Sierra Nevada and the mountains of Arizona, Utah, Washington and Wyoming, and the finding of a second species demonstrates the extension into Asia of a genus hitherto considered solely American. Kelloggia Chinensis is another and interesting example of the simultaneous existence in North America and central Asia of certain very characteristic plant types. Remarkable among many such cases is that of Ram's-head Lady Slipper, the presence of which in the mountains of western China was most unexpected."

In this year's "Grand Corso and Battle of Flowers," at Florence, one of the carriages which attracted the most attention was covered—body, wheels, steps, driver's box, whip and harness—with Lilies-of-the-valley, while the ladies who sat in it were dressed in white and carried parasols of the same flowers. Another carriage, dressed also with Lilies-of-the-valley, showed on each side the family coat-of-arms wrought with red blossoms. Another was adorned with Forget-me-nots and yellow Roses, another with white Roses and pink Azaleas, another with Lilacs and white Roses, another with Forget-me-nots and very small pink Rosebuds, another with Daisies, white Lilies and Maiden Hair ferns, another all with yellow Jonquils, and still another, described as especially graceful in effect, with great masses of Wistaria. Large umbrellas formed of flowers covered, like canopies, some of the smaller equipages, and in all cases the occupants were costumed in harmony with the decorations of their carriages.

Speaking of the extensive experiments of the Canadian Government in tree-cultivation, the *Popular Science Monthly* says: "At the Central Farm, near Ottawa, the seeds of Rocky Mountain and European conifers have been liberally sown; and in 1891 one hundred and seventy-five thousand seedlings were transplanted from the beds to be distributed later on to branch farms and private experimenters, who are to send in careful reports of progress. The Government also distributed one hundred thousand forest-tree seedlings among one thousand applicants in the northwest, with instructions for planting and subsequent treatment. Twenty-five gardens along the main line of the Canadian Pacific Railway have been supplied from the experimental farms. Speaking of the need of the application of forestry in the old provinces, Mr. J. C. Chapais mentions whole regions as known to him which were cleared by settlers who had to desert the land soon afterward because it was worth nothing. Such districts, he adds, would have been so many inexhaustible wood-reserves for future generations, but are to-day useless."

About the middle of May Secretary Lyon, of the Business Men's Moderation Society of this city, began his annual work of distributing flowers to the children of the city poor. He took his station in Paradise Park, that oddly misnamed little pleasure-ground which lies in the vicinity of Mulberry Bend and the Five Points, at three o'clock, just when the schools were dismissing their pupils. The flowers, which had been brought that morning from New Jersey, included Violets, Wistarias, Honeysuckles, Lilacs and Dogwood-blossoms, and were tied in bunches of convenient size. As they were given into the eager little hands, the scene was a noisy as well as a smiling one, and the windows of adjoining tenements were crowded with grown persons, who shared the children's delight. This special charity is not fathered by the society of which Mr. Lyon is the Secretary, but is personally his own; and most, if not all, of the flowers which he thus distributes from time to time come from his grounds at Short Hills, and are gathered and arranged by his children. More good is done in ways like this than in many of the ways with which charity has been longer familiar; and the good is to the donors, of course, as well as to the recipients. Very few New York business men can be expected to take the time and trouble needed for the actual following of Mr. Lyon's example; but there are many who, with very little trouble indeed, could regularly send quantities of flowers for distribution to him, to some hospital, or to one of the many charitable societies which would be thankful to receive and distribute them.

A developing fruit appears to be comparable with a chemical laboratory on a small scale. Here we have inorganic matter converted into organic matter, and the latter changed by the life-processes into other varieties of organic matter, in a way which we can only marvel at. Last summer ripening cherries were made the subject of a special study by W. Keim, who has recently published the details of his research in the *Zeitschrift für Analytisches Chemie* (*vide* xxx., pp. 401–407). He specially examined the changes which take place in the chemical composition during the growth and maturity of Prunus cerasus. The variety studied was the early Griotte, specimens of which were gathered from a single tree, at intervals of seven to ten days, and analyzed, and the *Gardeners' Chronicle* gives a summary of the conclusions reached. As the fruit ripens the percentage of water decreases, the dry substance increases, so does the acid, and, of course, too, the total amount of sugar. In the earlier stage of maturity, citric acid (the acid of lemons), malic acid (the acid of apples) and succinic acid are present, but nine days before perfect maturity is reached the latter quite disappears. Invert sugar is present from the start, and in the last stage is ten per cent. of the entire weight. Dextrose and levulose (two sugars) are present, with inosite, another sweet substance at first, but toward the end the inosite occurs merely as a trace. The progressive increase in the percentage of acid during the whole period is not in harmony with the old view that the sugar is formed at the expense of the acid. The disappearance of succinic acid as ripening is approached suggests the theory that the other acids are formed synthetically. Cane-sugar is present only in the leaves, in proportions which increase as the ripening is approached, but subsequently diminishes. No starch was detected at any stage in the growth of the fruit, though the parenchyma-cells of the peduncle showed starch-granules, increasing in amount as the fruit ripened.